

WHAT IS CLAIMED IS:

1. A semiconductor interconnection system, comprising:
a semiconductor die;
first and second conductive contacts, said first conductive contact coupled to a
surface of said semiconductor die, and said second conductive contact coupled to an external
structure or die;
a silver epoxy bond interposed between said first and second conductive contacts,
said epoxy bond providing electrical and mechanical interconnection between said
semiconductor die and said external structure; and
an insulating island configured to prevent migration of silver from said silver epoxy
bond to said semiconductor die through said first conductive contact.

2. The system of claim 1, wherein said semiconductor die is a photodetector.

3. The system of claim 2, wherein said photodetector is a p-i-n photodiode.

4. The system of claim 1, wherein said insulating island comprises a layer of
oxide.

1 5. The system of claim 1, further comprising:
2 a conductive electrode heavily doped with p-type material at the surface of said
3 semiconductor die to provide electrical connection between said semiconductor die and said
4 external structure.

1 6. The system of claim 5, further comprising an insulator/metal bonding
2 structure disposed above said insulating island, said insulator/metal bonding island providing
3 direct contact between the silver epoxy bond and the conductive electrode, thereby providing
4 required electrical connection between said semiconductor die and said external structure.

1 7. The system of claim 1, wherein said semiconductor die is silicon and the
2 insulating island is thermally grown silicon dioxide.

1 8. The system of claim 1, wherein said insulating island provides reduction in
2 transmission of mechanical stress from said silver epoxy bond into the semiconductor die.

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1 9. A semiconductor flip-chip, comprising:
2 a semiconductor die having a plurality of conductive contacts;
3 a plurality of epoxy bonds having a metallic component, said epoxy bonds configured
4 to provide interconnection between said semiconductor die and an external structure, said
5 plurality of epoxy bonds selectively applied to said plurality of conductive contacts on said
6 semiconductor die and corresponding conductive contacts on the external structure; and
7 an array of insulating islands coupled to said plurality of conductive contacts, said
8 insulating islands configured to prevent migration of said metallic substance from said
9 plurality of epoxy bonds to said semiconductor die through said plurality of conductive
10 contacts.

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1 10. The flip-chip of claim 9, wherein said metallic substance is silver.

1 11. The flip-chip of claim 9, wherein said semiconductor die is a semiconductor
2 illumination detector chip.

1 12. The flip-chip of claim 9, wherein said plurality of conductive contacts on said
2 semiconductor die forms connections to an array of photodiode pixels.

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1 13. The flip-chip of claim 11, wherein said array of insulating islands prevents
2 degradation of low reverse-bias leakage currents in said array of photodiode pixels.

1 14. A method of manufacturing a flip-chip interconnection device, comprising:
 2 providing an array of insulating islands on a semiconductor die;
 3 applying a plurality of metal contacts over said array of insulating islands; and
 4 selectively depositing an array of epoxy bonds on said plurality of metal contacts,
 5 where said providing said array of insulating islands prevents migration of metallic substance
 6 in said array of epoxy bonds into said semiconductor die.

1 15. The method of claim 14, further comprising:
 2 aligning said array of epoxy bonds on top of respective metal contacts on an external
 3 structure; and
 4 bonding said semiconductor die to said external structure.

1 16. The method of claim 14, wherein said providing said array of insulating
 2 islands includes depositing a layer of thermally grown silicon dioxide.

1 17. The method of claim 14, wherein said applying said plurality of metal
 2 contacts provides an array of insulator/metal bonding islands disposed on top of said array of
 3 insulating islands, said array of insulator/metal bonding islands operating to provide direct
 4 electrical contact between the array of epoxy bonds and the semiconductor die.

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